

CONTRA COSTA COUNTY

Greenhouse Gas Emissions Inventory Report



JUNE 2008

This report is intended to supercede the report dated August 2007. Greenhouse gas emissions data has changed significantly as a result of modifications in accounting software, which is now specialized to local conditions—including updated emissions factors that reflect local transportation patterns and energy sources (based on the California Air Resources Board's EMFAC model and PG&E energy sources in California), as well as updated waste disposal emissions calculations.

Table of Contents

1.	Introduction	3
1.1	Climate Change Legislation in California	3
1.2	Contra Costa County's Climate Protection Efforts	3
1.3	The Purpose of the GHG Emissions Inventory	3
2.	Contra Costa County GHG Emissions Inventory	4
2.1	Baseline GHG Emissions Inventory	4
2.2	GHG Emissions Reduction Target	7
3.	Next Steps	8
3.1	Actions to Meet the Reduction Target	8
3.2	Monitoring Progress Toward the Reduction Target	9
	Appendices	11
	Appendix A. Data Collection Methods	12
	Appendix B. U.S. Cool Counties Climate Stabilization Declaration	13
	Appendix C. Actions to Meet the Reduction Target	15
	Appendix D. Cost Method	20
	Acknowledgements	21
	Bibliography	22

1. Introduction

1.1 Climate Change Legislation in California

California's *Assembly Bill No. 32: the Global Warming Solutions Act* (Nunez 2006) requires California to reduce its greenhouse gas (GHG) emissions to 1990 levels by 2020. Meeting this target will require that the state government record and report California's GHG emissions for 1990 and for future years through 2020, using periodic GHG emissions inventories. Additionally, many local governments are monitoring their own GHG emissions in order to reduce their impact on climate change.

1.2 Contra Costa County's Climate Protection Efforts

Contra Costa County's commitment to mitigating climate change began in May 2005, when the Board of Supervisors convened department heads in a Climate Change Working Group (CCWG) to identify existing County activities and policies that potentially reduced its GHG emissions. The County's Climate Change Working Group is comprised of the Agricultural Commissioner, the Deputy Directors of the Department of Conservation and Development for Building Inspection and Community Development, the Director of General Services, the Director of Health Services, and the Director of Public Works. In November 2005, the CCWG presented its Climate Protection Report to the Board of Supervisors, which included a list of existing and potential GHG reduction measures (available online at www.ccrecycle.org/climate/). To quantify Contra Costa County's current GHG emissions and to evaluate the impact of these GHG reduction measures, the Board of Supervisors approved a resolution in February 2007 to join ICLEI – Local Governments for Sustainability (formerly known as the International Council for Local Environmental Initiatives) and to conduct a GHG emissions inventory of Contra Costa County's countywide and municipal emissions, resulting in this report.

1.3 The Purpose of the GHG Emissions Inventory

Numerous federal, state, and local governments are conducting inventories of their GHG emissions in order to identify emissions sources and to plan for and track reductions over time. After conducting a GHG emissions inventory for a baseline year, municipalities can target their efforts to address the most significant emissions sources and effectively reduce their overall emissions. Projected “business-as-usual” forecasts provide a benchmark against which the municipality can measure reduction progress.

The GHG emissions inventory uses data on energy use, fuel use, and waste disposal to capture emissions from both municipal operations and from countywide activities. However, the GHG inventory does not capture all sources of GHG emissions, such as emissions from air travel, the transportation of waste to disposal locations, or the burn-off of feed stock fuel components at refineries.

The GHG inventory is only the first of five milestones in ICLEI's Cities for Climate Protection Campaign. Upon completion of the GHG inventory, the municipality sets a GHG reduction target and then develops a Climate Action Plan to achieve this target.

2. Contra Costa County GHG Emissions Inventory

2.1 Baseline GHG Emissions Inventory

The GHG emissions inventory examines emissions at two levels: countywide and County municipal operations. The County government has the most control over and, therefore, the greatest power to reduce emissions from its municipal operations. However, considering the existing quantity and sources of countywide GHG emissions in Contra Costa, it is clear that the County will not be able to achieve substantial long-term countywide emissions reductions solely by implementing measures that fall within the County's existing authority and jurisdiction.

The GHG emissions inventory was conducted using 2005 as the countywide baseline year for consistency with other local governments, and 2006 as the municipal baseline year due to data quality and availability. After data was collected from various County departments and external agencies and organizations (see Appendix A for detailed notes on data collection methods), it was entered into ICLEI's Clean Air and Climate Protection (CACP) software tool to generate the results in Tables 2.1 through 2.3.

Table 2.1 shows GHG emissions from countywide activities, including energy use, vehicle transportation, and waste disposal. Additionally, energy use is broken down into the residential and commercial/industrial sectors. Data for the unincorporated area of Contra Costa County is shown separately as this is the area over which the County has jurisdiction. The sources that represent the largest percentages of total emissions tend to be the focus of reduction efforts.

Table 2.1. Countywide GHG emissions in 2005

Emissions Source	MTCO ₂ e*	Percent of Total
<i>County Total</i>	12,335,904	
Energy Use - Residential	1,587,655	13%
Energy Use - Commercial/Industrial/Direct Access	6,030,798	49%
Transportation	4,542,073	37%
Landfilled Waste	175,378	1%
<i>Unincorporated Total</i>	4,775,296	
Energy Use - Residential	279,439	6%
Energy Use - Commercial/Industrial/Direct Access	3,500,768	73%
Transportation	972,754	20%
Landfilled Waste	22,335	1%
Incorporated	7,560,608	61%
Unincorporated	4,775,296	39%

* MTCO₂e, or metric tons of carbon dioxide equivalent, describes the amount of carbon dioxide that would have the same climate change potential as the actual assortment of greenhouse gases.

Table 2.1 shows that a large proportion of Contra Costa County's countywide GHG emissions result from commercial/industrial energy use and transportation. The high emissions number for commercial/industrial energy use is largely due to natural gas use in the refineries located in Contra Costa County. However, as mentioned previously, the industrial emissions number shown is exclusively based on energy use and does not include emissions from refinery operations.

This second table spotlights GHG emissions generated by Contra Costa County municipal operations, broken down into the larger categories of energy use, fuel use by the vehicle fleet, and waste disposal. Note that the emissions in this table are a *subset* of the total countywide emissions reflected in Table 2.1.

Table 2.2. Municipal GHG emissions in 2006

Emissions Source	MTCO ₂ e	% of Total
Building Energy Use	19,260	63%
Electricity	11,359	37%
Natural Gas	7,667	25%
Propane	207	1%
Stationary Diesel	27	0%
Streetlight Energy Use	828	3%
Water/Sewage Energy Use	40	0%
Vehicle Fleet	8,502	28%
Gasoline	7,460	24%
Diesel	696	2%
B20 Biodiesel	218	1%
CNG	127	0%
Landfilled Waste	1,976	6%
Total	30,606	100%

Table 2.2 shows that a large proportion of Contra Costa County's municipal GHG emissions result from building electricity and natural gas use and from fleet gasoline use. The disposal of waste generated by Contra Costa County facilities and operations represents a less significant part of the municipal emissions inventory.

There is currently debate about whether local governments should include, and therefore take responsibility for, GHG emissions from employee commute—and many governments choose not to include employee commute in their inventories. However, because the County has this data readily available from County employee commute surveys, these emissions are included below—but separately from the previous table that focuses solely on municipal operations.

Table 2.3. Municipal GHG emissions, including employee commute, in 2006

Emissions Source	MTCO ₂ e	% of Total
Building Energy Use	19,260	36%
Electricity	11,359	21%
Natural Gas	7,667	14%
Propane	207	0%
Stationary Diesel	27	0%
Streetlight Energy Use	828	2%
Water/Sewage Energy Use	40	0%
Vehicle Fleet	8,502	16%
Gasoline	7,460	14%
Diesel	696	1%
B20 Biodiesel	218	0%
CNG	127	0%
Employee Commute	23,527	43%
Landfilled Waste	1,976	4%
Total	54,133	100%

Table 2.3 demonstrates that, when included, employee commute is a significant source of Contra Costa County's municipal GHG emissions. In fact, employee commute is the County's largest emissions source in base year 2006.

In an effort to compare Contra Costa County's GHG emissions with those of other counties, Table 2.4 uses population and employment data to calculate GHG emissions per person and per government employee. As counties are diverse in size, these metrics make it possible to compare emissions across counties.

Table 2.4. GHG emissions from four Bay Area counties

County	Countywide base year	Countywide emissions (metric tons)	Countywide emissions per person (metric tons)	Residential emissions per person (metric tons)	Municipal base year	Municipal emissions (metric tons)	Municipal emissions per employee (metric tons)
Alameda	2005	5,180,381	5.3	1.2	-	-	-
Contra Costa	2005	12,335,904	12.0	1.6	2006	54,133	6.4
Marin	2005	3,188,522	12.8	2.4	2005	24,124	13.4
San Francisco	2000	9,700,000	13.0	2.5	2005	213,898	7.7

The emissions numbers above were found in the Alameda County Climate Action Plan Template 2007, the Marin County Re-Inventory of Greenhouse Gas Emissions, California Climate Action Registry's Annual Emissions Report on San Francisco, and the Climate Action Plan for San Francisco. Population numbers were obtained from the U.S. Census Bureau, and government employment numbers were found in the Marin County Affirmative Action Report and the San Francisco Annual Report on Workforce Analysis, for the closest available year to the baseline year.

These numbers suggest that Contra Costa County has relatively low municipal GHG emissions and average countywide GHG emissions (although much higher than Alameda County). However, as illustrated in Table 2.5, even when controlling for population size, many other differences between counties make a direct comparison of countywide emissions misleading.

Table 2.5. Countywide source comparison for four Bay Area counties

Emissions Source	% of total countywide emissions			
	Alameda	Contra Costa	Marin	San Francisco
Energy Use – Residential	23%	13%	19%	19%
Energy Use – Commercial & Industrial	32%	49%	18%	30%
Transportation	45%	37%	62%	51%
Waste	-	1%	2%	<i>Included in industrial</i>

The percentages above were found in the Alameda County Climate Action Plan Template 2007, the Marin County Re-Inventory of Greenhouse Gas Emissions, and the Climate Action Plan for San Francisco.

Table 2.5 shows that almost 50% of Contra Costa County's countywide emissions result from its significant industrial base, while this sector represents only 18% to 32% for the other three counties. While transportation is the largest source of countywide GHG emissions for the other three counties, commercial and industrial energy use is the largest source in Contra Costa County. This comparison shows that the County's reduction efforts and achievements will be unique to Contra Costa County conditions.

2.2 GHG Emissions Reduction Target

Upon the completion of the GHG emissions inventory, the municipality sets a GHG reduction target to drive its emissions reduction efforts.

Contra Costa County has joined over 30 other U.S. counties in adopting the long-term reduction target set by the U.S. Cool Counties Climate Stabilization Declaration (see Appendix B). This declaration calls for the County to work closely with local, state, and federal governments and other leaders to develop a regional plan to reduce county geographical GHG emissions to 80% below current levels by 2050. Additionally, the declaration states that the regional plan (a Climate Action Plan that includes countywide measures) should establish short- and long-term GHG reduction targets, with recommended goals to stop increasing emissions by 2010, and to achieve a 10 percent reduction every five years thereafter through to 2050.

Because this target year is far in the future, adoption of several interim GHG reduction targets can help municipalities stay on track toward this long-term target. Furthermore, Contra Costa County could consider adopting a specific target for its municipal emissions. To inform the

selection of interim and municipal GHG reduction targets for Contra Costa County, Table 2.6 illustrates targets that have been set by some other Bay Area cities and counties.

Table 2.6. GHG reduction targets set by other Bay Area cities and counties

Municipality	Cool County?	City/countywide targets	Municipal targets
Berkeley, CA		80% below current levels by 2050 15% below 1990 levels by 2010	
Oakland, CA		15% below 1990 levels by 2010	
Alameda County, CA	✓	80% below current levels by 2050	
Marin County, CA	✓	80% below current levels by 2050 15% below 1990 levels by 2020	15-20% below 1990 levels by 2020
San Francisco County, CA		20% below 1990 levels by 2012 This is equivalent to 35% below 2000 levels by 2012	

This information was found in ICLEI's Milestone Guide, City of Berkeley's Measure G, the U.S. Cool Counties Climate Stabilization Declaration, the Marin County Re-Inventory of Greenhouse Gas Emissions, and the Climate Action Plan for San Francisco.

Note that the baseline years vary significantly between these targets. Contra Costa County's recent baseline year (2006) should be considered in target-setting, as Contra Costa County's target may be lower due to reductions already achieved from existing measures implemented prior to the 2006 baseline year. The County can also quantify GHG reductions from existing measures and include these reductions when tracking progress toward its reduction target.

Contra Costa County has numerous opportunities to implement projects and policies that could further reduce GHG emissions from their current levels. Contra Costa County can achieve GHG emission reductions most efficiently and effectively by evaluating existing and potential GHG reduction measures as the first step in the development of a Climate Action Plan.

3. Next Steps

The GHG inventory is only the first step in reducing GHG emissions. The second step is the establishment of a GHG reduction target as discussed in Section 2.2. The third step is the development of a Climate Action Plan, which involves gathering data (where it is available) on the predicted activity reduction and implementation cost associated with existing actions and potential measures that could further reduce emissions.

3.1 Actions to Meet the Reduction Target

Contra Costa County's recent baseline years (2005 and 2006) should be considered in analyzing progress toward a GHG reduction target, due to reductions already achieved from existing measures implemented prior to the 2005 and 2006 baseline years. Thus, the County will quantify the impacts of its existing GHG reduction measures in order to include these reductions in its progress analysis.

The County has already implemented many measures that have reduced its GHG emissions, and many of these measures could be expanded to further reduce emissions. Appendix C lists existing and potential reduction measures, as identified in the November 2005 Climate Protection Report and further discussions with County staff. The potential measures that are highlighted in this report represent those that were identified by County staff to be the most operationally feasible and/or expected to have the greatest GHG reduction potential based on information currently available.

Potential GHG reduction measures to be considered or evaluated during the development of a Climate Action Plan should not necessarily be limited to those identified in this report or the November 2005 Climate Protection Report. The selection of potential GHG reduction measures should consider GHG reduction potential (if available), operational feasibility, cost, payback period (if applicable), and availability of rebates and funding.

While countywide reduction measures may result in greater overall GHG reductions, the County government has greater control over its municipal emissions. Additionally, the County can lead by example and inspire changes in the greater community by first focusing on development and implementation of a Municipal Climate Action Plan focused on reduction measures that target emissions generated by municipal operations. Furthermore, data on current municipal GHG reduction measures suggests that there is great potential to expand existing measures, such as increasing employee participation in commute programs or expanding building energy efficiency efforts to additional County buildings.

If data can be obtained on the estimated energy/transportation/waste reductions and implementation costs for these measures, the CACP software can model potential GHG emissions reductions and cost savings resulting from each measure. This will allow the County to identify the most cost effective measures (including those with available funding, low cost, or short payback periods) as well as those with the potential to reduce the most GHG emissions. Using this information, the County can prioritize measures for implementation. After the County adopts and has begun implementing a Climate Action Plan, interim inventories can tell the County whether the identification of additional reduction measures will be necessary to meet the adopted reduction targets.

It is important to note that some of the potential measures identified in these two Reports are similar to measures identified in previous initiatives that addressed public policy issues such as traffic congestion, air pollution, energy conservation, waste reduction, or open space preservation. These previous initiatives identified financial, institutional, and market barriers that can limit the effectiveness of certain reduction measures. The Climate Action Plan will need to address these same barriers in order to achieve the GHG reductions.

3.2 Monitoring Progress Toward the Reduction Target

The County should consider conducting interim inventories to monitor progress toward the reduction target. While the countywide emissions inventory requires only a few data items (as countywide totals are calculated for other purposes), the municipal emissions inventory requires data from many different County departments and external agencies. However, additional research demonstrates that the County possesses the ability to quickly monitor municipal GHG emissions using only data and software that the County keeps internally. This finding is explained below and shown in detail in Appendix D.

The 2006 municipal emissions inventory was completed using two methods: a method based on usage data, which generated the data shown in Section 2.1; and a method based on cost data (which can be obtained easily from the County's own Auditor's Office and the software program *Utility Manager*) coupled with price assumptions. This "cost method" was completed in less than one week, and generated results that were very similar to those generated by the more detailed "usage method."

Table 3.1 compares the results derived by these two data collection methods. The total municipal GHG number derived by the cost method is only 2% less than that derived by the usage method. Furthermore, the most policy-relevant data from the inventory is the source composition (or the percentage of emissions that come from each source), as this informs which sources should be the focus of reduction efforts. The similarity of the source composition between the two methods suggests that the cost method can predict the results of the usage method with acceptable accuracy. This implies that the cost method can be used for future municipal GHG inventories to easily and accurately monitor progress toward the reduction target, as long as the target is applied to the 2006 numbers derived by the cost method.

Table 3.1. 2006 municipal GHG emissions results generated by the usage and cost methods

Emissions Source	Usage MTCO ₂ e	Usage % of total	Cost MTCO ₂ e	Cost % of total
Energy Use	20,128	66%	19,706	66%
Electricity	12,227	40%	12,729	42%
Natural gas	7,667	25%	6,751	22%
Propane (jail kitchens)	207	1%	211	1%
Diesel (generators)	27	0%	16	0%
Vehicle Fleet	8,502	28%	8,582	29%
Gasoline	7,460	24%	7,477	25%
Diesel	696	2%	799	3%
B20 biodiesel	218	1%	228	1%
CNG	127	0%	78	0%
Landfilled Waste	1,976	6%	1,726	6%
Total	30,606	100%	30,014	100%

While Table 3.1 does not include emissions from employee commute, the Community Development Department's Transportation Planning Division has the data and tools necessary to estimate the cost of employee fuel purchases for commute.

With the completion of the GHG inventory and preliminary identification of existing and potential GHG reduction measures, the County is on its way toward developing an effective Climate Action Plan. With further research on the GHG reduction potentials and the implementation costs associated with the identified measures, Contra Costa County can develop and implement the most cost-effective Climate Action Plan that will reduce its GHG emissions and, therefore, its contribution to climate change.

Appendices

Appendix A. Data Collection Methods

Countywide Data

GHG Emissions Source	Methods
Residential, Commercial, and Industrial Energy Use	Usage data from PG&E, through ICLEI workshop.
Transportation	Total vehicle miles traveled data from MTC, through ICLEI workshop.
Waste	Waste disposal data from CIWMB, through ICLEI workshop. Assume an 85% methane recovery factor based on direction from staff at Contra Costa County waste facilities.

Municipal Operations Data

GHG Emissions Source	Methods
Electricity and Natural Gas Use	Usage data for all accounts from PG&E. Match PG&E accounts with their County descriptors in Utility Manager. Sort accounts into categories for analysis using County descriptors. GSF values from the County property list (revised by Terry Mann in General Services where necessary).
Propane Use	Usage data from Utility Manager.
Diesel Use	Diesel data for emergency generators from Doug Parker in Facilities Maintenance.
Fleet	Fuel consumption data from Richard Battersby, Fleet Manager.
Waste	Generate lists of addresses and account numbers of all Contra Costa County accounts from Utility Manager, and send to different vendors. Routine waste data from hauling facilities; illegal dumping data from transfer stations, landfills, and internal records. When only volume data is available, use a density assumption from ICLEI. Assume an 85% methane recovery factor based on direction from staff at County waste facilities.
Employee Commute	2003 employee commute survey results from Heba El-Guendy in Transportation Planning. Employment data from the 05-06 Comprehensive Annual Financial Report. Use survey results to obtain an estimate of the average trip distance and work days/year, and to calculate total vehicle miles. Assume that all vehicles use gasoline fuel (verified by Xico Manarolla at ICLEI).

This activity data was entered into the CACP tool to generate GHG emissions numbers.

Appendix B. U.S. Cool Counties Climate Stabilization Declaration

IN THE MATTER OF CONTRA COSTA COUNTY ADOPTING THE U.S. COOL COUNTIES CLIMATE STABILIZATION DECLARATION:

WHEREAS, there is a consensus among the world's leading scientists that global warming caused by human emission of greenhouse gases is among the most significant problems facing the world today;

WHEREAS, documented impacts of global warming include but are not limited to increased occurrences of extreme weather events (i.e., droughts and floods), adverse impacts on plants and wildlife habitats, threats to global food and water supplies – all of which have an economic impact on communities and their local governments;

WHEREAS, leading scientists have projected that stabilization of climate change in time to minimize such impacts will require a reduction of global warming emissions to 80 percent below current levels by the year 2050;

WHEREAS, currently the United States is responsible for producing approximately 25 percent of the world's global warming pollutants;

WHEREAS, many leading U.S. companies that have adopted greenhouse gas reduction programs to demonstrate corporate and operational responsibility have also publicly expressed preference for the federal government to adopt precise and mandatory emissions targets and timetables as a means by which to provide a uniform and predictable regulatory environment to encourage and enable necessary and long-term business investments;

WHEREAS, state, regional and local governments throughout the United States are adopting emissions reduction targets and programs and that this effort is bipartisan, coming from Republican and Democratic leadership;

WHEREAS, the U.S. Conference of Mayors has endorsed the U.S. Mayors Climate Protection Agreement, which commits cities to reduction of global warming emissions to 7 percent below 1990 levels by 2012, and calls for a federal limit on emissions;

WHEREAS, the State of California has mandated statewide reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050;

WHEREAS, more than 100 county leaders signed a letter written by Dane County, Wisconsin, that was sent to the President in March 2006 calling for increased energy investment and development of jobs focused on clean energy technologies;

WHEREAS, counties have a unique role to play in reducing greenhouse gas emissions and preparing for the impacts of climate change through their regional jurisdiction over policy areas such as air quality, land use planning, transportation, zoning, forest preservation, water conservation, and wastewater and solid waste management;

WHEREAS, the economic arguments for implementing climate solutions are compelling, from the near-term economic gains of energy efficiency to the long-term climate stabilization that can prevent irreparable harm from catastrophic climate change impacts;

WHEREAS, many counties throughout the nation, both large and small, are reducing global warming pollutants through programs that provide economic and quality of life benefits such as reducing energy bills, preserving green space, implementing better land use policies, improving air quality, promoting waste-to-energy programs, expanding transportation and work choices to reduce traffic congestion, and fostering more economic development and job creation through energy conservation and new technologies;

NOW, THEREFORE BE IT RESOLVED, that the County of Contra Costa declares that we as Cool Counties will take immediate steps to help the federal, state, and our governments within our county to achieve the 2050 climate stabilization goal by making the following commitments:

- i. Create an inventory of our county government (operational) greenhouse gas (“GHG”) emissions and implement policies, programs and operations to achieve significant, measurable and sustainable reduction of those operational GHG emissions to help contribute to the regional reduction targets as identified in paragraph ii;
- ii. Work closely with local, state, and federal governments and other leaders to reduce county geographical GHG emissions to 80 percent below current levels by 2050, by developing a GHG emissions inventory and regional plan that establishes short-, mid-, and long-term GHG reduction targets, with recommended goals to stop increasing emissions by 2010, and to achieve a 10 percent reduction every five years thereafter through to 2050.
- iii. Urge Congress and the Administration to enact a multi-sector national program of requirements, market-based limits, and incentives for reducing GHG emissions to 80 percent below current levels by 2050. Urge Congress and the Administration to strengthen standards by enacting legislation such as a Corporate Average Fuel Economy (“CAFE”) standard that achieves at least 35 miles per gallon (mpg) within 10 years for cars and light trucks.

BE IT FINALLY RESOLVED, that the County will take immediate steps to identify regional climate change impacts; we will draft and implement a county plan to prepare for and build resilience to those impacts.

The above resolution was adopted by the Contra Costa County Board of Supervisors on October 2, 2007.

Appendix C. Actions to Meet the Reduction Target

The following measures were originally identified in the November 2005 Climate Protection Report (#s listed in the table originated from that report), and have been updated by the Climate Change Working Group staff designees for this report. The potential measures that are highlighted in this report represent those that were identified by County staff to be the most operationally feasible and/or expected to have the greatest GHG reduction potential.

Countywide GHG Reduction Measures

Existing and Planned Measures

- 58 Establish urban growth boundaries
- 61a Offer density bonuses for development projects that include specified number of affordable housing units
- 62a Encourage mixed use development to limit some travel distances
- 64a Conduct a weatherization program to assist low and/or fixed income households in making their homes more energy efficient
- 65a Adopt local ordinance to regulate wood burning appliances
- 67a Allow use of cool roofing systems to reduce a building's energy usage
- 73a Adopt Green Building Guidelines for residential construction/remodeling
- Require developers to provide information on commute alternatives available to residents or workers of their project (County Code, Chapter 82-32).
- 74a Require the preservation of trees in urban areas
- 76 Require new developments to use drought-tolerant landscaping
- 77 Require new developments to use water conserving irrigation systems
- 78a Require new developments to install landscaping
- 83a Require development projects to construct bicycle & pedestrian amenities
- 85a Require certain large development projects to construct park-and-ride lots
- 87a Require certain large development projects in designated transit areas to install features to support mass transit
- 90a Inform local residents and business on how they can "Stop Junk Mail"
- 91a Help businesses in unincorporated areas find opportunities to reduce waste
- 92a Adopt residential variable can rate structures to promote reduction/recycling
- 93a Curbside recycling is provided with all standard residential garbage service
- 94 Offer home composting education and resources
- 95a Provide residents and businesses with easily accessible information regarding local alternatives to disposal
- 96 Encourage use of recycled materials by manufacturers
- 97a Inform residents regarding the proper methods to manage their unwanted household chemicals and electronics
- 98 Use methane from landfills to generate electricity
- 104 Recognize businesses that adopt green business practices
- 105a Adopt ordinance(s) to require the use of water conserving landscaping and irrigation systems in private development projects
- 106a Work with member agencies to manage and fund development of HCP/NCCP to preserve & enhance habitats

Potential Measures

- 63 Analyze potential climate impacts prior to making recommendations regarding approval or denial of development projects
- Revise the County's ordinances for development impact fees to include fees for pedestrian, bicycle, transit and traffic calming improvements
- Revise the County's roadway standards to balance the needs of motorists, bicyclists and pedestrians in the design and construction of streets
- Update general plan policies and design standards to encourage pedestrian and bicyclist activity
- Encourage employers to comply with state-mandated employee parking cash-out programs (Chapter 554, California Statutes of 1992)
- Revise zoning ordinance to include limitations on the maximum number of parking spaces to serve new development
- 68 Adopt energy efficiency standards for all development projects
- 72 Require that adequate space for storage and collection of recyclables be provided in all development projects
- 73c Adopt a green building rating/point system based on the Green Building Guidelines
- 73d Utilize third-party green building certification process
- 75 Require new developments to plant native trees in medians and common areas
- 78b Require new developments to use permeable pavements in place of impervious pavements
- 78c Revise the County's landscape standards to increase the amount of overall landscaping required and specify the best types of vegetation to use in designated areas
- 84 Implement the Neighborhood Traffic Management Program
- 89a Revise street lighting standards to require use of LEDs in all new outdoor lighting
- 89b Require use of solar energy to power specific types of outdoor lighting (e.g. flashers)
- 92b Expand variable can rate structures to the remaining unincorporated areas in Central and East County
- 93b Mandate recycling collection at all multi-family complexes in the unincorporated areas
- 97b Identify additional opportunities and potential funding sources to expand education programs regarding toxic discards
- 99 Adopt a local manure management ordinance for horse boarding facilities
- 103 Use agricultural materials to generate fuel, which produces renewable energy and manages waste

Municipal Operations GHG Reduction Measures

Existing and Planned Measures

- 6a Performed seven facility-level and two county-wide energy assessments
- 3a Installed direct digital control (DDC) systems for heating, ventilating and air conditioning (HVAC) systems in 33 major County facilities and new County buildings & remodels
- 3b Improved, retrofitted and replaced HVAC systems in 15 selected County buildings
- Implemented heat recovery projects for the Regional Medical Center and the Pittsburgh Health Center
- 4a Installed state-of-the-art lighting technology and systems in 7 selected County facilities

- Expanding lighting retrofit program to 14 additional County buildings
- 13a Participate in energy demand response programs for 20 selected County facilities
- 5a Installed variable frequency motor drive technology in most possible 9 buildings
- 5b Installed vending misers on 60 vending machines
 - Install LEDs in 50% of building exit signs
 - Will install LEDs in the remaining 50% of building exit signs
- 17 Use LEDs in most traffic signals
- 18 Installed LEDs in 70% of pedestrian signals
 - Installing LEDs in the remaining 30% of pedestrian signals as they fail
 - Conducting pilot studies on LED streetlight technology
- 7a Designed/installed cogeneration plants for the Martinez Detention Facility and the West County Detention Facility
 - Designing and installing cogeneration plants for the Regional Medical Center and the Juvenile Hall, which operate 24-hours per day
- 8a Installed photovoltaic solar panels on the rooftops of the Martinez Detention Facility and 50 Douglas
- 2a Design energy usage in 3 new County buildings to be at least 10% below California's Title 24 requirements
- 10a Use cool roofing systems for selected County buildings
- 10b Standard for cool roofing systems in new County buildings and remodels
- 12a Install thermally resistant window films on selected County facilities
- 25 Use water conserving landscaping and irrigation systems
- 41 Include pricing for environmental specifications in the process of requiring bids for building materials
- 42a Require contractors/vendors to provide recycled-content/recyclable products
- 38 Standard for Allsteel 50% recycled-content, 99% recyclable office furniture
- 40 Purchased 100,000 square yards of 50% recycled-content, 100% recyclable carpeting for County buildings
- 37c As of August 2007, more than 100 items on the county office supply contract have been replaced with recycled-content equivalents
- 37b Purchased recycled-content office paper (35% of paper)
- 37a Purchased recycled-content toner cartridges (45% of cartridges)
- 36a Require that all County business cards produced by General Services be printed on recycled-content paper
 - Purchasing high efficiency motors, appliances, and equipment as they fail
 - Buying Energy Star equipment/appliances when possible
 - Contract for EPEAT certified Dell computers
- 43 Adopt and enforce an environmentally preferable purchasing policy
- 34 Minimize purchase of sport utility vehicles
- 35 Capture evacuated vehicle air conditioning freon & refrigerant
- 33a Installed diesel particulate traps on (37) heavy-duty vehicles
 - All (168) diesel fleet switched to B20 biodiesel fuel in September 2006
- 29 Purchased (12) electric vehicles
- 30a Purchased (72) hybrid (gasoline and electric) fleet vehicles
- 32a Install a "fast fill" CNG fueling facility
- 31a Purchased (39) compressed natural gas (CNG) vehicles
 - Purchased 29 FlexFuel vehicles, and 13-14 patrol cars with be replaced with FlexFuel

- equivalents each year
- Considering the installation of an above-ground 5,000-gallon E85 ethanol fuel tank for the County's 29 (and growing) FlexFuel vehicles as well as other users (CHP and CALTRANS)
- 51a Offer financial incentives to County employees for using transit or forming a new carpool
- 50a Provide financial incentives to County employees participating in a vanpool (25% off monthly costs)
- 55a Provide (30) free preferred parking stalls for County employees' vehicles used for carpooling
- 56a Provide bicycle lockers and/or racks at work sites to encourage County employees to bike to work
- 57a Provide shower facilities at certain work sites to encourage County employees to bike, walk or run to work
- 52a Allow County employees to work using flex schedules and compressed work weeks
- 49a Implement Telecommuting Program for employees to reduce vehicle trips
- 47a Recycle paper from County buildings
- 47b Collect and recycle beverage containers from County buildings & parks
- 44a Conduct ongoing program to facilitate reuse and recycling of office furniture and equipment from County buildings
- 48 Recycle municipal landscaping debris
- 45b Direct consulting architects and engineers to reuse as much of the existing structures and building materials as possible
- 45a Require contractors to recycle waste from building/remodeling projects whenever feasible
- 20a Use the minimum amount of pavement necessary for safety and durability
- 27a Maintain existing trees located on County owned and/or maintained land

Potential Measures

- 1c Further increase the sustainable building design and construction standards for all new and remodeled buildings to meet LEED Silver standards
- 2b Further increase the energy efficiency construction standards for new County buildings
- 3c Expand HVAC improvement and retrofit program to additional County buildings
- 4b Expand lighting retrofit program to additional County buildings (14 projects planned)
- 4c Optimize County building lighting efficiency through the use of lighting controls, and include daylight harvesting technologies
- 7b Design/install cogeneration plants for other County facilities that operate 24-hours per day (planned for the Regional Medical Center and the Juvenile Hall)
- 8b Evaluate additional renewable power projects (such as solar) for County facilities
- 14 Incorporate efficiency and sustainability criteria when selecting sites for new buildings and leases
- Locate County buildings in walkable neighborhoods with high frequency transit service
- Institute user fee for parking spaces owned or leased by the County and allocate surplus revenue to incentives for use of commute alternatives
- 18b Install LEDs in the remaining 30% of pedestrian signals (planned to be upgraded as they fail)
- 27b Plant shade trees on the east and west sides of County buildings to save energy
- 28 Use natural vegetation and landscaping around paved surfaces
- 30b Add more hybrid vehicles to the fleet
- 31b Add more CNG vehicles to the fleet

- 32b Consider additional alternative fueling stations or infrastructure (such as E85 ethanol fuel)
- 33 Continue to install diesel particulate traps on heavy-duty vehicles
- 36b Adopt Administrative Bulletin directing all departments to print business cards on recycled-content paper
- 37c Replace more of the office supplies on the County's core list with acceptable recycled-content equivalents (currently over 100 items have been replaced with recycled-content equivalents)
- 39 Purchase high efficiency motors, appliances and equipment (planned to be upgraded as they fail)
- 42b Expand requirements for future bids to include additional environmental specifications
- 44b Amend policy that allows departments to destroy hard drives before sending them to Surplus (this may require expensive degaussing equipment for Health Services due to Hippa requirements)
- 44c Amend policy to require that Surplus property only be disposed with Board approval after exhausting any local donation or recycling options
- 45a Require contractors to recycle a specific percentage of construction waste from County building and remodeling projects
- 46b Increase the amount of double-sided copying and printing, including voluntary to mandatory actions
- 47c Expand the recycling collection program for beverage containers to additional County facilities
- 47d Establish notification system to inform County Recycling Program staff of all office location changes
- 49c Identify opportunities to increase the number of employees that participate in the Telecommuting Program
- 51b Allow County employees to use pre-tax dollars to pay for mass-transit or carpool expenses
- 52b Increase the number of County departments that institute compressed work weeks

Appendix D. Cost Method

Methods used to obtain activity data from cost data

Emissions Source	Cost Method
Electricity and Natural Gas Use	Cost data from accounting software <i>Utility Manager</i> . According to the DOE, the average price of electricity in California in 2006 was \$0.1328/kWh and that of natural gas was \$1.182/therm. Assume that 10% of the electricity and natural gas cost represents taxes and fees, based on a Utility User's Tax of about 8% in Contra Costa County.
Propane Use	Cost data from Utility Manager. 2006 propane price derived from averaging the price on a January bill (\$2.50/gallon) and a November bill (\$2.70/gallon) to generate \$2.60/gallon. Assume that 10% of the propane cost represents taxes and fees.
Diesel Use	Diesel cost data from account clerk Maria Martinez. According to the DOE, the average price of diesel in California in 2006 was \$2.922/gallon. Doug Parker in Facilities Maintenance estimates that about 50% of the total purchased emergency fuel is actually consumed for routine testing and emergencies.
Fleet	Cost data from account clerk Maria Martinez. According to the DOE, the average price of gasoline in California in 2006 was \$2.855/gallon and that of diesel was \$2.922/gallon. According to the DOE, the average price of B20 biodiesel in the U.S. in 2006 was \$2.740/gallon and that of CNG was \$1.887/GGE. According to the DOE, California biodiesel prices were generally about \$0.25 higher than the U.S. average in 2006, which yields a B20 biodiesel price of \$2.990/gallon. However, according to Fleet Services, the County Government is exempt from all state and federal excise taxes, which are included in these price averages. The total of state and federal excise taxes for gasoline in California in 2006 was \$0.364/gallon, that for diesel was \$0.424/gallon, that for B20 biodiesel was \$0.224/gallon after a federal tax credit of \$0.20/gallon, and that for CNG was \$0.0984/GGE.
Waste	Cost data for haulers from Utility Manager. Cost data for transfer stations and landfills from Auditor's intranet site. Recovery rates from Solid Waste Program Manager Deidra Dingman with supporting annual summaries and advice to assume a recovery rate of 50% when unknown. From internet research and County bills, the average fee for hauling waste is about \$65/ton.

Cost data and calculations

Emissions Source	Total Cost (\$)	Total Cost – taxes/fees (\$)	Activity/\$		Activity data	
			amount	units	amount	units
Energy Use						
Electricity	\$8,026,452	\$7,223,807	7.530	kWh/\$	54,396,136	kWh
Natural gas	\$1,657,789	\$1,492,010	0.846	therm/\$	1,262,276	therms
Propane (jail kitchens)	\$99,341	\$89,407	0.385	gallons/\$	34,387	gallons
Diesel (generators)	\$9,582	-	0.342	gallons/\$	1,640	gallons
Fleet						
Gasoline	\$2,057,518	-	0.401	gallons/\$	825,981	gallons
Diesel	\$199,716	-	0.400	gallons/\$	79,950	gallons
B20 biodiesel	\$82,635	-	0.362	gallons/\$	29,875	gallons
CNG	\$19,224	-	0.559	GGE/\$	10,748	GGE
Landfilled Waste						
Haulers	\$782,269					
Transfer, Landfills	\$51,721					
Total	\$833,990	-	0.015	tons/\$	12,831	tons

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